STATEMENT OF BASIS

Title V Air Quality Operating Permit Renewal

Northern Border Pipeline Company – Station #10

Near Crocker, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 BACKGROUND

On November 14, 1997, Northern Border Pipeline Company (Northern Border) was issued a Title V air quality operating permit (#28.9932-18) for the operation of a natural gas fired compressor station (Compressor Station #10) located near Crocker, South Dakota. The SIC code for this facility is 4922.

Northern Border's Compressor Station #10 was initially permitted in 1997. The permit was renewed in November, 2002, and September 2005. On April 1, 2009, the department issued an administrative amendment to revise the responsible official. On September 15, 2009, Northern Border submitted an application to renew its operating permit. The application was considered to be complete by the department on September 28, 2009. Permit condition 4.2 states that if a timely and complete application for permit renewal is submitted six months prior to the date of expiration, then the existing permit shall not expire and the conditions of that permit shall remain in effect until the Secretary takes final action on the permit renewal application.

The current Title V air quality operating permit contains federally enforceable operating restrictions that limit nitrogen oxide emissions from the facility to 238 tons per year or less. This restriction prevents Northern Border from having to obtain a Prevention of Significant Deterioration (PSD) permit. Northern Border has requested the renewal permit contain restrictions for the same purpose.

There have been no complaints or violations filed against this facility since the last permit review.

2.0 OPERATIONAL DESCRIPTION

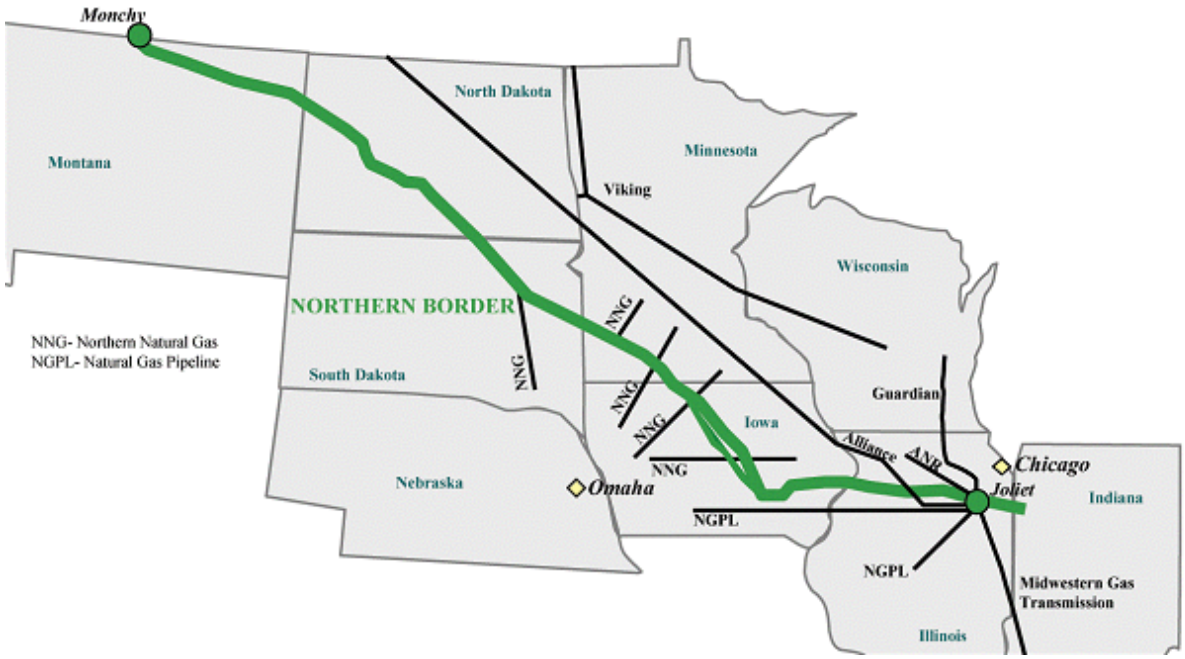
Table 1 lists the equipment operated at Northern Border Compressor Station #10 that will be considered during this permit renewal.

Table 1 – Operational Description

Operating Units	Equipment	Operating Rate	Control Equipment
Unit #1	1998 Cooper-Rolls, Coberra 6562 DLE, natural gas fired combustion turbine	320 MM Btus per hour heat input	N/A (lean-premix combustion to reduce nitrogen oxide emissions)
Unit #2	1991Waukesha, model H24GL emergency generator	530 Hp (4.33 million Btus/hr heat input)	N/A
Unit #3	1991 RayPak natural gas fired boiler	1.13 million Btus per hour	N/A

Northern Border's Compressor Station #10 is part of a natural gas pipeline extending from the Montana-Saskatchewan border to interconnecting pipelines in the upper Midwestern United States (see Figure 1).

Figure 1
Map of Northern Border's Pipeline through South Dakota



3.0 EMISSION FACTORS

3.1 Combustion Turbine

Nitrogen oxide and carbon monoxide are the main pollutants emitted by the combustion turbine. Operating the turbine in lean-premix combustion (DLE) mode reduces the emissions of nitrogen oxide. The department received a letter in May 2004, notifying the department that stack tests on identical units have shown nitrogen oxide emissions can exceed the manufacturer data if not operating in DLE mode. The DLE system cannot be engaged during startup and shutdown, at reduced turbine loads that occur due to upstream and downstream upsets, or during mechanical testing.

A stack test was performed on an identical unit at Compressor Station #11 on February 16, 1999, to determine the controlled nitrogen oxide emission rate when the DLE system was operational. A stack test was performed on an identical unit at Compressor Station #1 on October 27, 2003, to determine uncontrolled nitrogen oxide emission rates when the DLE was not operational. Both performance test reports are on file with the department.

Northern Border has requested that DENR use the non-DLE nitrogen oxide emission rates from a 2006 test performed on a similar unit in Minnesota – non-DLE NOx emissions were 70.95 lb/hr. Northern Border requested that a more conservative non-DLE emission factor of 78.0 lb/hr be utilized. Similarly, Northern Border has requested that the DLE emissions be based upon the turbine manufacturer's guaranteed emission rate of 52.0 lbs/hr and not the emission rated determined in the 1999 stack test. Northern Border has also requested that the total non-DLE hourly operation of the unit be decreased from 650 hours to 500 hours per 12-month rolling average.

EPA's AP-42 document lists controlled and uncontrolled carbon monoxide emission factors as well as emission factors for other criteria pollutants. Table 2 summarizes the emission factors for total suspended particulate matter (TSP), particulate matter less than 10 microns (PM10), sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), and hazardous air pollutants (HAPs).

Table 2 **- Turbine emission factors**

Pollutant	TSP/PM10[a,b]	SO2 [a, c]	NOx (pounds per hour)	CO [a]	VOCs [a]	HAPs [a]
Uncontrolled [lb/MMBtu][d]	0.0066	0.0066	78	0.082	0.0021	0.001
Controlled [lb/MMBtu][d]	0.0066	0.0066	52	0.015	0.0021	0.001

[a] – EPA AP-42, Fifth Edition, Section 3.1, 4/00;
[b] – All of the PM emitted is assumed to be less than 10 microns;
[c] – Based on maximum fuel sulfur content of 2.0 grains per 100 standard cubic feet (0.007% by weight) according to Northern Border gas tariff; and
[d] – lb/MMBtu represents pounds per million British thermal units

3.2 Emission Factors for Emergency Generator

Uncontrolled emission factors for the generators fueled with natural gas were derived from AP-42, 3.2-3 Natural Gas Fired Reciprocating Engines. The emission factors for the generators for total suspended particulate matter (TSP), particulate matter less than 10 microns (PM10), sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), and hazardous air pollutants (HAPs) are summarized in Table 3. The generators have no control devices; therefore potential uncontrolled and controlled emissions are equivalent and will be referred to as potential emissions.

Northern Border has requested that DENR use the manufacturer's emission data for NOx of 1.5 grams per horsepower-hour and a safety factor of 5. Using a conversion factor of 454 gram per pound, this would convert to 8.8 pounds per hour.

Table 3- Generator emission factors

Pollutant	TSP/PM10	SO2[a]	NOx	CO	VOCs	HAPs
	0.019	0.0059	8.8 pounds per hour	3.72	0.0296	0.03242

[a] Based on maximum fuel sulfur content of 2.0 gr/100scf (0.007% by weight) according to Northern Border gas tariff
[b] – lb/MMBtu represents pounds per million British thermal units

3.3 Emission Factors for Boilers

The emission factors for the heating plant boilers are derived from EPA's Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Tables 1.4-1 and 1.4-2, 7/98. Boilers with a heat input capacity less than 100 million Btus per hour are classified in AP-42 as small boilers. The following are the air emission factors for total suspended particulate matter (TSP), particulate matter less than 10 microns (PM10), sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), and hazardous air pollutants (HAPs) for the combustion of natural gas in small boilers:

Table 4 – Emission factors for boilers

Pollutant	*TSP/ PM-10*[a]	*SO2* [b]	*NOx*	*CO*	*VOC*	*HAPs*
Emission factor [lb/MM scf][c]	7.6	0.6	100	84	5.5	1.88
Emission factor [lb/MM Btu][c, d]	0.007	0.0006	0.098	0.082	0.005	0.0018

[a] It is noted in AP-42 that particulate emissions from burning natural gas are all less than one micron in diameter. Therefore, the emission factor for particulate matter less than 10 microns in diameter (PM10) is the same as the emission factor for total suspended particulate (TSP).
[b] "S" indicates that the weight percent of sulfur in the oil. The sulfur content of distillate oil was derived from the application and is listed as 0.05 weight percent sulfur, which equates to an emission rate of 7.1 pounds per 1,000 gallons.
[c] – lb/MMscf and lb/MMBtu represent pounds per million standard cubic feet and pounds per million British thermal units, respectively
[d] To convert from lb/MM scf to lb/MM Btu, divide lb/MM scf by 1,020, the average natural gas heating value.

4.0 POTENTIAL EMISSIONS

4.1 Combustion Turbine

Potential emissions from the combustion turbine are the emissions that would occur if the unit operates 8,760 hours per year (24 hours per day for 365 days). Uncontrolled emissions are calculated assuming the turbine operates continuously in non-DLE mode. Controlled emissions are calculated assuming the turbine operates continuously in DLE mode. Potential emissions calculated for each pollutant are as shown in Table 5.

Equation 4.1 – Potential Emissions from Combustion Turbines

$$Uncontrolled\ Emissions\left[\frac{tons}{year}\right] = \left(\frac{EmissionFactor\left[\frac{lbs}{hp-hr}\right] * AnnualOperations\left[\frac{hrs}{year}\right] * Rate\left[hp\right]}{2000\left[\frac{lbs}{tons}\right]}\right)$$

$$Controlled\ Emissions\left[\frac{tons}{year}\right] = \left(\frac{ControlledEmissionFactor\left[\frac{lbs}{hp-hr}\right] * AnnualOperations\left[\frac{hrs}{year}\right] * Rate\left[hp\right]}{2000\left[\frac{lbs}{tons}\right]}\right)$$

Table 5 – Potential Emissions from Combustion Turbines (tons per year)

	TSP/PM10	SO2	NOx	CO	VOCs	HAPs
Uncontrolled Emissions (Non-DLE)	9.25	9.25	342	114.9	2.94	1.4
Controlled Emissions (DLE)	9.25	9.25	228	114.9	2.94	1.4

4.2 Emergency Generator

Using Equation 3.2 - the maximum designed operating rate in horsepower, an efficiency of 35%, and a conversion factor of 0.0025 Btus per Horsepower-hour were used to calculate the maximum designed operating rate based on heat input of the generator in million Btus (MMBtus) per hour.

Equation 4.2 – Heat Input Calculation

$$HeatInput\left[\frac{MMBtus}{hr}\right] = \left(\frac{OperatingRate\left[Hp\right] \times 0.0025\left[\frac{Btu}{hr \times Hp}\right]}{10^6\left[\frac{Btu}{MMBtu}\right] \times 35\%}\right)$$

Using Equation -4.2, the emergency generator has a heat input of 3.85 MM Btus/hr. The emergency generator is classified as a natural gas-fired, reciprocating, 4-stroke, rich burn engine. The uncontrolled emission factors shown in Table 2 are derived from EPA's AP-42 document, Fifth Edition, Section 3.2, Table 3.2-3.

Based on EPA's memo from John S. Seitz to the directors of EPA's regional offices, dated September 6, 1995, the potential emissions from an emergency generator may be based on operating 500 hours per year. Therefore, the potential to emit will be based on 500 hours per year.

The potential to emit (PTE) for the emergency generator was determined using emission factors from Table 3, an annual operating rate of 500 hours per year, the heat input calculated from Equation 4.3, and a conversion factor of 2,000 pounds per ton.

Equation 4.3 – Potential Emission Calculations

$$PotentialEmissions\left[\frac{tons}{year}\right]=\left(\frac{EmissionFactor\left[\frac{pounds}{MMBTU}\right]\times AnnualOperations\left[\frac{hr}{year}\right]\times HeatInput\left[\frac{MMBtu}{hr}\right]}{2000\left[\frac{pounds}{tons}\right]}\right)$$

To calculate the NOx emissions, using the manufacturer's emission factor 1.5 grams/hp-hr and the safety factor of 5 as requested by Northern Border:

$$PotentialEmissions\left[\frac{tons}{year}\right]=5x\left(\frac{EmissionFactor\left[\frac{grams}{Hp-hr}\right]\times AnnualOperations\left[\frac{hr}{year}\right]\times Horsepower}{2000\left[\frac{pounds}{tons}\right]}\frac{1pound}{454grams}\right)$$

In order to avoid a Prevention of Significant Deterioration (PSD) review, Northern Border has requested federally enforceable operating restrictions on the generator limiting its use to 500 hours per year or less.

Table 6 - Potential Emissions – Emergency Generator (tons per year)

Description	TSP/ PM-10	SO2	NOx	CO	VOCs	HAPs
Emergency Generator	0.02	0.006	2.2	3.6	0.03	0.03

4.3 Boiler

Uncontrolled emission factors for each applicable pollutant from the boiler was derived from the Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume 1 (AP-42). The factors for the boiler fired by natural gas were derived for boilers with less than 100 million Btus (MMBtus) heat input from Table 1.4-1 and 1.4-2 (7/98).

Equation 4.4 was used to calculate the potential emissions from burning natural gas for each air pollutant in tons per year.

Equation 4.4 – Potential Uncontrolled Emission Calculations

$$Potential\left[\frac{\text{tons}}{\text{yr}}\right]=\left(\frac{EmissionFactor\left[\frac{lbs}{MMBtu}\right]\times AnnualOperations\left[\frac{hr}{yr}\right]\times Heat\,Input\left[\frac{MMBtu}{hr}\right]}{2000\left[\frac{lbs}{tons}\right]}\right)$$

Table 7– Potential Emissions – Boiler (tons per year)

Description	TSP/ PM-10	SO2	NOx	CO	VOCs	HAPs
Boiler	0.04	0.003	0.5	0.4	0.3	-

4.4 Potential Emissions Summary

Table 8 summarizes the results of the potential uncontrolled emission calculations for the combustion turbine and the auxiliary generator. Shown are the potential emissions of each pollutant from each source as well as the total facility potential to emit for each pollutant.

Table 8– Facility Uncontrolled Emissions Summary

Description	TSP/ PM-10	SO2	NOx	CO	VOCs	HAPs
Turbine (tons per year)	9.25	9.25	342	115	2.94	1.40
Emergency Generator (tons per year)	0.02	0.006	2.2	3.6	0.03	0.03
Boiler (tons per year)	0.04	0.003	0.5	0.4	0.3	-
TOTAL (tons per year)	**9**	**9**	**345**	**119**	**3**	**1**

Based on the above calculations, Northern Border is classified as a major source for nitrogen oxide and carbon monoxide emissions under the Title V air quality operating permit program.

The boiler potential emissions are less than 2 tons per year and has a heat input less than 3.5 million Btus, therefore, the boiler is considered an insignificant activity as is exempt from permitting based Administrative Rules of South Dakota 74:36:05:04.01(4) and 74:36:05:04.01(7)

5.0 PERMIT REQUIREMENTS

5.1 New Source Review

ARSD 74:36:10:01 states that New Source Review regulations apply to areas of the state, designated as nonattainment pursuant to the Clean Air Act, for any pollutant regulated under the Clean Air Act. The facility is located near Crocker, South Dakota, which is in attainment for all the pollutants regulated under the Clean Air Act. Therefore, Northern Border's Compressor Station #10 is not subject to the New Source Review program.

5.2 Prevention of Significant Deterioration

Any stationary source constructed or modified after August 7, 1977 which emits or has the potential to emit 250 tons per year or more of any air pollutant is subject to Prevention of Significant Deterioration (PSD) requirements. Any stationary source which emits, or has the

potential to emit, 100 tons per year or more of any air pollutant and is subject to one of the named PSD source categories is subject to PSD requirements.

Northern Border is not one of the 28 PSD source categories. Compressor Station #10 is considered a major source under the PSD program because its potential nitrogen oxide emissions exceed 250 tons per year and the facility was constructed after 1977.

5.2-1 Federally Enforceable Permit Requirements

Northern Border has requested federally enforceable operating restrictions that limit potential nitrogen oxide emissions below 250 tons per year and allow Compressor Station #10 to remain a minor source under the PSD program. The generator will again be restricted to operating 500 hours on a 12-month rolling basis, limiting nitrogen oxide emissions to 2.21 tons per year from this source.

Previously, the department and Northern Border agreed that the permit will require the turbine to be operated in DLE mode except during startup and shutdown, at reduced turbine loads that occur due to upstream and downstream upsets, or during mechanical testing which prohibits DLE operation. This restriction is contained in the current permit. The permit condition states that the turbine can be operated in non-DLE mode not more than 650 hours per 12-month rolling period (7.4% of possible operating time). Northern Border is required to monitor turbine operations and submit periodic reporting of the 12-month rolling totals for non-DLE and generator operation to prove compliance with this condition. Northern Border has requested in the renewal application to reduce the non-DLE mode restriction of 650 hours per 12-month rolling period to 500 hours per 12-month rolling period. Table 9 below illustrates the potential nitrogen oxide emissions under these operating restrictions.

Table 9 –Limited nitrogen oxide emissions under operating restrictions

Operation	Emission Rate [lbs NOx / hour]	Operating Time [hours / year]	Resulting Emissions [a] [tons NOx / year]
Generator	8.51	500	2.2
Controlled (DLE mode)	52	8,260	215
Uncontrolled (non DLE mode)	78	500	19.5
TOTAL LIMITED NOx [tons per year]			**237**

[a] – resulting emissions = emission rate X operating time ÷ 2000 lbs per ton

A PSD review will not be required as long as Northern Border agrees to and complies with the generator and turbine operating restrictions.

5.3 New Source Performance Standards

The department reviewed the new source performance standards for stationary sources and determined that the following may be applicable:

5.3-1 ARSD 74:36:07:18 – 40 CFR, Part 60, Subpart GG, Standards of Performance for Stationary Gas Turbines

This standard is applicable to all stationary gas turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules per hour (equivalent to 10 million Btus per hour) and were constructed, modified, or reconstructed after October 3, 1977. The stationary gas turbine at Compressor Station #10 has a heat input greater than 10 million Btus per hour. Therefore, the stationary gas turbine is subject to this new source performance standard. The specific requirements for this subpart are described below.

- In accordance with 40 CFR 60.332(d), the stationary gas turbine is subject to an allowable nitrogen oxide emission limit based on 40 CFR 60.332(a)(2), and defined by Equation 5.1.

  Equation 5.1 – Nitrogen oxide limit

  $$STD = 0.0150\frac{14.4}{Y} + F$$

  where: STD = allowable nitrogen oxide emission limit (percent by volume at 15 % oxygen and on a dry basis);
  Y = manufacturer's stated heat rate at manufacturer's rated peak load (kilojoules per watt hour); and
  F = nitrogen oxide emission allowance for fuel-bound nitrogen.

  Based on a manufacturer's specified heat rate at peak load of 7,038 Btu/hp-hr (9.95 kilojoules per watt hour) and taking no credit for fuel-bound nitrogen in the pipeline gas, the allowable emission rate is 0.0217 percent by volume nitrogen oxide or 217 ppm nitrogen oxide. In accordance with 40 CFR 60.332(k), Northern Border is exempt from the nitrogen oxide emission limit when being fired with an emergency fuel. Northern Border does not have a back-up fuel; therefore, this exemption is not applicable.

  Northern Border performed the stack testing required in this new source performance standard on units identical to the stationary gas turbine at Compressor Station #10. The department accepted the performance test report for demonstrating compliance with the nitrogen oxide emission limit. The resulting nitrogen oxide emission rates were 29.2 ppm when the DLE is operational and 74.9 ppm when the DLE is not operational. This demonstrates that the unit is capable of complying with the nitrogen oxide emission limit during all operations;

- Compressor Station #10's turbine is subject to either a sulfur dioxide emission standard of 0.015 % by volume at 15 % oxygen on a dry basis or a fuel sulfur content of less than 0.8 % by weight for the fuel burned in the turbine. The turbine will burn pipeline quality natural gas that has a sulfur content of less than 0.8 % sulfur; therefore, the turbine will be in compliance with this standard; and

- This subpart was amended in July 2004, so that facilities with turbines that burn fuel meeting the definition of natural gas will not be required to monitor the sulfur content of the fuel. It

was also amended so that only sources claiming a fuel-bound nitrogen credit are required to monitor the nitrogen content of the fuel being fired in the turbine. Northern Borders burns fuel meeting the definition of natural gas and does not claim a fuel-bound nitrogen credit; therefore, monitoring for the sulfur content and nitrogen content will not be required.

5.3.2 ARSD 74:36:07:05 - 40 CFR, Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.

This subpart is applicable to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million Btu per hour) or less, but greater than or equal to 2.9 MW (10 million Btu per hour).

Units #3 was constructed in 1991 but has a maximum heat input of 1.13 million Btu per hour. Therefore, this subpart is not applicable to the steam boiler.

5.3.3 ARSD 74:36:07- 40 CFR Part 60, Subpart JJJJ Standard of Performance for Stationary Spark Ignition Internal Combustion Engines

The department review of the NSPS determined the 40 CFR Part 60, Subpart JJJJ may be applicable. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. Subpart JJJJ is applicable to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

- On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);
- On or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP;
- On or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
- On or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 HP).
- Owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006.

Northern Border operates one natural gas-fired generator rated at 532 horsepower that was installed in 1991. This would be prior to the Subpart JJJJ date of July 1, 2007 for generators greater than 500 Hp. Subpart JJJJ is not applicable to these generators.

5.3.4 ARSD 74:36:07- 40 CFR Part 60, Subpart Subpart KKKK—Standards of Performance for Stationary Combustion Turbines

The department review of the NSPS determined the 40 CFR Part 60, Subpart KKKK may be applicable. Subpart KKKK is applicable to the owner or operator of a stationary combustion

turbine with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, which commenced construction, modification, or reconstruction after February 18, 2005. Unit #11 has a heat input at peak load greater than 10 MMBtu per hour. However, the unit was constructed in 1998, which predates the applicable date of this subpart. Therefore, this subpart is not applicable.

5.4 National Emission Standards for Hazardous Air Pollutants

The national emission standards for hazardous air pollutants, in 40 CFR, Part 61, define requirements for industries that emit specific hazardous air pollutants (HAPs). The national emission standards for hazardous air pollutants were promulgated prior to the 1990 Clean Air Act Amendments and may be superseded in 40 CFR, Part 63. Natural gas pipeline transmission facilities are not among the industries listed in 40 CFR, Part 61. Compressor Station #10 does not emit threshold amounts of any pollutant or combination of pollutants listed in 40 CFR, Part 61 and is therefore not subject to the national emission standards for hazardous air pollutants.

The maximum achievable control technology standards, in 40 CFR, Part 63, define major source categories that emit HAPs above the Title V air quality operating permit programs major source thresholds. A major source for HAPs is one that emits 10 tons per year of any individual HAP or 25 tons per year of total HAPs. The potential controlled HAP emissions from Northern Border's Compressor Station #10 are less than the major source threshold; therefore, Compressor Station #10 is considered a minor source of HAPs and is not applicable to this subpart.

5.5 Title V Air Quality Operating Permit

Any source operating in South Dakota that meets the requirements of ARSD 74:36:05:03 is required to obtain a Title V air quality operating permit. Northern Border is required to obtain a Title V operating permit because the potential nitrogen oxide and carbon monoxide emissions from Compressor Station #10 are greater than 100 tons per year.

5.6 State Emission Limits

In accordance with ARSD 74:36:06:01, any unit required to be permitted must comply with the states' particulate matter and sulfur dioxide standards and requirements. Unit #3 is exempt from permitting.

Unit #3 is exempt from permitting under ARSD 74:36:05:04.01(4) and (7). The unit has a rated heat input of 1.15 million BTU's per hour. In accordance with ARSD 74:36:05:04:01(4), any device or apparatus with a heat input capability of not more than 3.5 million Btus per hour is considered an exempt activity. The unit has potential emissions of less than 2.0 tons per year of a criteria pollutant. In accordance with ARSD 74:36:05:04.01(7), a unit that emits less than 2.0 tons per year of a criteria pollutant is exempt from permitting.

South Dakota has air emission limits for particulates and sulfur dioxide. Particulate and sulfur dioxide emission limits for fuel burning units are derived from ARSD 74:36:06:02. The emission limits for particulates are based on total suspended particulates.

Equation 5.2, taken from ARSD 74:36:06:02(1) (b) is used to calculate the state limit of particulate emissions. The particulate emission limit for the turbine is based on its heat input. Northern Border reported the maximum design capacity as 320 million Btus per hour of heat input.

Equation 5.2 – State particulate emission limit for fuel burning units

$$E\ \frac{lbs}{MMBtu} = 0.811 \times H^{-0.131}$$

Where H is the heat input capacity in units of millions of Btus per hour.

The turbine's calculated limit from Equation 5.2 is 0.4 pounds per million Btu.

In accordance with ARSD 74:36:06:02(1)(a), the particulate matter emission limit is 0.6 pounds per million Btus heat input to the generator (Unit #2) because its maximum heat input capacity is less than 10 million Btus per hour.

In accordance with ARSD 74:36:06:02(2), the sulfur dioxide emission limit is three pounds per million Btus of heat input for each fuel burning unit. However, in accordance with ARSD 74:36:06:01, a unit that is required to meet a sulfur dioxide emission limit under the new source performance standards is not required to meet the state's sulfur dioxide emission limit. Therefore, Unit #1 is not required to meet the state's sulfur dioxide emission limit.

The emission factors for the turbine and generator were compared to the state emission limits as illustrated in Table 10.

Table 10 - Potential emission rate versus state emission limit

Unit	Pollutant	**Potential Emission Rate** [pounds per million Btus]	**State Emission Limit** [pounds per million Btus]
Turbine	***TSP***	0.007	0.4
Generator	***TSP***	0.00194	0.6
	SO_2	0.0059	3.0

Based on the comparison and Northern Border's compliance history, Compressor Station #10 is capable of operating in compliance with the state air emission limits.

5.6-2 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality operating permit. Northern Border's application was received after this date; therefore compliance assurance monitoring would be applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Compliance assurance monitoring is not applicable to the combustion turbine even though the potential nitrogen oxide emissions are greater than 100 tons per year because the DLE system is not required to meet the nitrogen oxide emission limit.

5.6-3 Periodic Monitoring

Northern Border is required to meet particulate, sulfur dioxide, nitrogen oxide, and visible emission limits. Monitoring for particulate, sulfur dioxide, and visible emissions is not warranted because Northern Border burns only natural gas in Units #1 and #2.

There are no monitoring requirements in the new source performance standards requirements for the nitrogen oxide emission limit. Therefore, periodic monitoring for nitrogen oxide will be based on stack tests. The last stack test submitted to the department to demonstrate compliance with the nitrogen oxide emission limit was conducted in 2003 at Compressor Station #1. Northern Border's three compressor stations in South Dakota operate identical units - the department will require one of the compressor stations to conduct a performance test for nitrogen oxides.

Northern Border is also required to meet operational limits on the operation of Unit #1 and #2. Periodic monitoring for the operational limits will be based on record and reporting requirements.

5.6-4 Air Fees

Title V sources are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants that are charged are particulate, sulfur dioxides, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by the department and are based on information provided by the source.

5.7 Summary of Applicable State Requirements

The potential to emit nitrogen oxide for Northern Border's Compressor Station #10 is greater than 250 tons per year. Therefore, Northern Border's Compressor Station #10 is required to obtain a Title V air quality operating permit and operate within the requirements stipulated in the following regulations:

- ARSD 74:36:05 - Operating Permits for Part 70 Sources;

- ARSD 74:36:07 - New Source Performance Standards;
- ARSD 74:36:07:23 – 40 CFR, Part 60, Subpart GG – Standards of Performance for Stationary Gas Turbines;
- ARSD 74:36:11 - Stack Performance Testing;
- ARSD 74:36:12 - Control of Visible Emissions; and
- ARSD 74:37:01 - Air Pollution Control Program Fees.

6.0 RECOMMENDATION

Based on the information submitted in the air quality permit renewal application, the department recommends conditional approval of a Title V air quality operating permit for Northern Border's Compressor Station #10.

Questions regarding this permit review should be directed to Keith Gestring, Natural Resources Engineer.